PLATTS 4TH ANNUAL NUCLEAR ENERGY CONFERENCE

"FEDERAL SUPPORT FOR A GROWING NUCLEAR POWER INDUSTRY"

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Thank you, and thank you to Platts for inviting me to address this conference. This morning you have heard much about the state of new nuclear power in the U.S. and with some of the notable speakers here, probably everything about U.S. expansion that needs to be said has been said, it just hasn't been said by everyone. But I am here to give you the Federal perspective on this exciting time in nuclear power, not only here in the United States but around the world. I also stand before you in the last year of an Administration, one that since its first day in office has recognized the importance of nuclear power to our nation's energy security and supply. Since the President took office in 2001, funding for nuclear energy has increased 330%. The President's FY 2009 request for nuclear energy funding released yesterday totals $932 million dollars, which marks the 7th consecutive budget increase President Bush has proposed for nuclear energy.

A key component of our work and one of our most successful programs at the Department of Energy is the Nuclear Power 2010 program or NP 2010. This program was initiated by President Bush in 2002, and is now approaching its final year having produced significant results toward its goal of reducing the technical, regulatory, and institutional barriers to the deployment of new nuclear power plants. DOE and the President have increased our commitment to cross the finish line by more than doubling its 2009 budget, calling on Congress to fund NP 2010 $241.6 million dollars to help ensure this important program can complete its work.

The NRC expects to receive twenty Construction and Operation License applications for thirty-one new reactors by seventeen different utility companies. Four COL applications for seven new reactors have been submitted to the NRC to date, three have been docketed. Two docketed COL applications, TVA's application for two AP1000 reactors at the Bellefonte site, and Dominion Energy's application for the ESBWR at the North Anna site involved close collaboration with the NP 2010 program during the preparation of the applications and we will soon begin interaction with the NRC to support responses to Requests for Additional Information. Three early site permits have been approved for the Clinton, Grand Gulf and North Anna sites, all apart of the NP 2010 cost share program, and a forth ESP permit is

pending. In addition, two new reactor design certifications have been approved by the NRC, the ABWR and the AP1000, and DOE is continuing with on-going first-of-a-kind design finalization activities for the standardized AP1000 and ESBWR designs, including: preparation of engineering analyses and calculations, design criteria documents, and total cost and schedule estimates necessary for an industry purchase of a new nuclear plant.

The NP 2010 program will continue to develop application preparation guidance for fifteen COL applications expected in 2008 to help resolve regulatory issues that could potentially delay or derail NRC approval. In addition to reducing regulatory and technical barriers to near-term deployment, the Federal government has important financial tools in the form of risk insurance, production tax credits and loan guarantees.

Government backed risk insurance will ensure financial protection from regulatory and litigation-related delays beyond the control of the project sponsors and production tax credits will be issued to offset some first-of-a-kind expenses. Both will encourage first-movers to the market.

Perhaps most importantly, DOE received authorization in the Fiscal Year 2008 Congressional appropriations to issue loan guarantees totaling up to $18.5 billion for new nuclear plants and $2 billion for "front end" facilities through Fiscal Year 2009. These loan guarantees will help sponsors raise the substantial up-front capital necessary for nuclear power plants, by providing the full faith and credit of the United States government to industry and by enabling DOE to share some of the financial risks of projects. Most importantly, loan guarantees allow plants to increase the project's debt-to-equity ratio, substantially reducing the cost of capital, and ultimately lowering the cost of clean power to the consumer.

Expansion of new nuclear power is needed, but maintaining the 20% share of the electricity supply that nuclear power generates is one of the most fundamental challenges facing us today, and with the expected increase in demand, that is no easy task. We will need approximately 45 new reactors on line by 2030 just to maintain the 20% share of U.S. electricity generation. This of course presumes that none of the current operating fleet will go off-line over that time period. Greater than 80% of the U.S. nuclear generating fleet have already, or are expected to achieve operating license renewals by the middle of the next decade. New reactors will contribute substantially to the generating mix in the near future. However, we also recognize that with presently expected new capacity and anticipated increases in energy demand, the pending retirement of the current generation of plants poses a significant hole in our generation

capacity. Therefore, increasing operating lifetime of existing reactors plays a vital role in the U.S. energy mix.

The Department of Energy, along with the Nuclear Regulatory Commission is beginning the search for answers. From February 19th through the 21st the Office of Nuclear Energy and the NRC are co-hosting a "Life Beyond 60" workshop. This initial workshop will identify research areas and priorities required for the long term operation of nuclear power plants. The event will address subjects such as, long-term reliability of systems, structures, and components; management of age-related materials degradation issues; and discussions of new technologies, tools, and applications for diagnostics and monitoring.

The Department is also facilitating development of an industry-wide strategic plan designed to provide research and development roadmaps to answer the technical questions that will allow us to consider longer-term reactor operations. In addition, the President has requested nearly $10 million in his Fiscal Year 2009 budget to begin reactor material aging and degradation research.

To further these twin goals of efficiently constructing and operating dozens of new nuclear power plants and maximizing the contribution from our existing nuclear fleet by extending the operating licenses and increasing the electrical output of today's reactors—I am proud to announce a cooperative research and development agreement between the Idaho National Laboratory and the Electric Power Research Institute. Today, INL and EPRI will release a joint *INL—Nuclear Power Industry Strategic Plan for Light Water Reactor Research and Development*. The plan was developed by a team led by INL's Utility Advisory Board and EPRI's Nuclear Power Council.

The proposed industry/government cost-shared R&D effort is focused on 10 objectives including:

- Sustaining the high performance of reactor plant materials
- Transitioning to state-of-the-art digital instrumentation and controls
- Making further advances in nuclear fuel reliability and lifetime
- Implementing broad-spectrum work-force development
- Implementing broad-spectrum infrastructure improvements and design for sustainability; and
- Addressing electricity infrastructure-wide problems

This partnership reflects an on-going effort between DOE and the nuclear power industry. Sustainability and expansion of nuclear power require public and private cooperation and significant investment in research and development.

The expansion of clean, emissions free, reliable nuclear power does not end at our borders. Today, thirty-one countries operate 439 reactors totaling 372 GWe of electricity capacity. Thirty-four new nuclear power plants are under construction worldwide, and when completed will add an additional 28 GW of new electricity. This new construction is taking place in almost every major region in the world including Africa, Asia and the Indian subcontinent, Europe, the Middle East, South America, and North America.

We have recently seen projections anticipating fifty-five total countries will operate 630 reactors totaling approximately 630 GWe by 2030. Potentially, a total of 86 countries could have nuclear reactors by 2050. Internationally, nuclear power is moving forward at a rapid pace with each month bringing new, significant announcements.

As Nuclear's reemergence gains momentum around the world and in the United States there still remains an important question: How will used fuel from nuclear power be best managed? This question is at the core of not only the U.S. expansion of nuclear power, but also, the United State's future role on the global stage. The United States must close the nuclear fuel cycle. Closing the fuel cycle is essential for expansion of nuclear power in the U.S. and around the world by transitioning from a once-through approach to one that includes recycling spent nuclear fuel without separating out pure plutonium. In our current once-through cycle, used nuclear fuel is planned for ultimate disposal in a permanent geological repository at Yucca Mountain. Recycling used nuclear fuel rather than permanently disposing of it in a repository would result not only in utilizing more of the energy in nuclear fuel, but also reduce the amount of high-level waste that needs disposal in a repository by decreasing radiotoxicity, heat loading, and ultimately repository volume required. This increased efficiency in the fuel supply would ensure that even with the expansion of nuclear energy, the potential capacity of any geological repository would be greatly enhanced.

By separating just the uranium and plutonium for reuse as fuel, the remaining material could reach roughly the same level of radiotoxicity as the originally mined uranium ore in approximately 10,000 years as opposed to the 300,000 plus years used fuel straight from the reactor will take to reach that level. When advanced recycling technologies are deployed, the separation of most long-lived actinides and fission products will greatly diminish the amount of material that needs disposal in a repository—and lower the time needed to reach the radiotoxicity of the original uranium ore to about 300 years.

Closing the U.S. fuel cycle is one aspect of the Global Nuclear Energy Partnership, a vision that seeks the expansion of nuclear energy in a safe and secure manner. GNEP has both broad international and

significant domestic aspects. The global aspect of GNEP is manifested through voluntary international partnership initiated by the United States. The domestic aspect is aimed at effectively managing both the resources available in used nuclear fuel and the associated waste. In an effort to leverage private—public cooperation GNEP is seeking input as a means of making the partnership a dynamic operational mechanism. Collecting technical, budgetary and environmental data and input enables GNEP to adjust, working to make it effective, economic, and technically feasible.

Because the implementation of recycyling will require industry participation, GNEP has involved leaders in the field to provide their input. Last month, four industry-led consortia submitted responses to a Funding Opportunity Announcement issued by DOE in May 2007. The FOA sought submissions from commercial entities to provide technology development roadmaps, business plans, and communications strategies supporting conceptual design studies for a nuclear fuel recycling center and advanced recycling reactor, and in September, DOE awarded over $16 million to begin producing the information and data that was recently submitted to DOE.

These conceptual design studies address the scope, cost, and schedule to build the initial recycling and fast reactor facilities. The technology development roadmaps describe the state of readiness for their proposed processes and design concepts, and the longer-term technology development needed to achieve the ultimate GNEP vision. The business plans address how the market may facilitate DOE plans to develop and foster commercialization of advanced fuel cycle technologies and facilities. And the communications plans provide DOE with tactics and objectives for dissemination of the scientific, technical, and practical information relating to nuclear energy and closure of the nuclear fuel cycle.

Since receiving the submissions on January 18—that together stack more than seven feet high—teams from DOE and the national laboratories have set forth on the task of reviewing every component of each consortium's response. The consortia have submitted multifarious pathways forward. Conceptual design studies show various separations technologies including aqueous and electro-chemical approaches. Two teams proposed the initial separations facility co-extract uranium with plutonium while two propose group transuranic separations. Proposed initial separations facility capacities range from 50 MT/year to as much as 2000 MT/year. Recycling technologies include near-term deployment options that generate plutonium bearing fuel for use in existing light-water reactors. Initial fast reactor designs range in size from 300 MWe to 500 MWe with costs ranging from as low as $2 Billion to $4.5 Billion. Technology readiness levels vary and the technology development roadmaps address existing technology gaps.

Deployment schedules call for initial operation of separations and fuel fabrication facilities in the 2018 to 2028 timeframe and deployment of prototype fast reactors between 2018 and 2025.

Industry has told us that meaningful steps can be taken in the near-term to close the fuel cycle by 2020 to 2025. Submissions suggested that government take a fresh look at nuclear waste management by taking an integrated approach including recycling and repositories. They suggested that the establishment of a government corporation with access to the nuclear utility waste fund could result in effective management of the construction and operation of recycle facilities and repositories and would substantially reduce investment required by the U.S. government. Although these actions require significant changes to legislation and regulations, addressing the waste issue is paramount to a successful nuclear renaissance.

What's important is that DOE has sought input and industry is weighing-in. These submissions show there are sound economic cases for deployment of near-term recycling technology, but changes in current waste strategies are needed. They show additional research and development is needed for fast reactor technology, but given public support the reliability and economics can be achieved. Analysis of these submissions continue, and this is only a broad overview of what we received from the four consortia, pending feedback and funding continuation, they will be given until April to further develop their conceptual design studies, technology development roadmaps, and business and communications plans that will inform the Secretary's decision on the path forward for GNEP later in 2008.

This industrious effort and investment is being made because it is nuclear power that is the only currently viable near-term option for significant increases in emissions-free electricity production. As the President said during the signing of recently enacted energy legislation: "If we are serious about making sure we grow our economy and deal with greenhouse gases, we have got to expand nuclear power."

GNEP comes at a crucial time in the burgeoning expansion of nuclear power, and a crucial time for our nation's energy security. It is the only comprehensive proposal to close the nuclear fuel cycle in the United States, and engage the international community to minimize proliferation risks as well as provide and benefit from cooperation in policy formation, technical support, and technology and infrastructure development.

I again want to thank Platts for inviting me to speak to all of you today and I look forward to answering any questions you may have.